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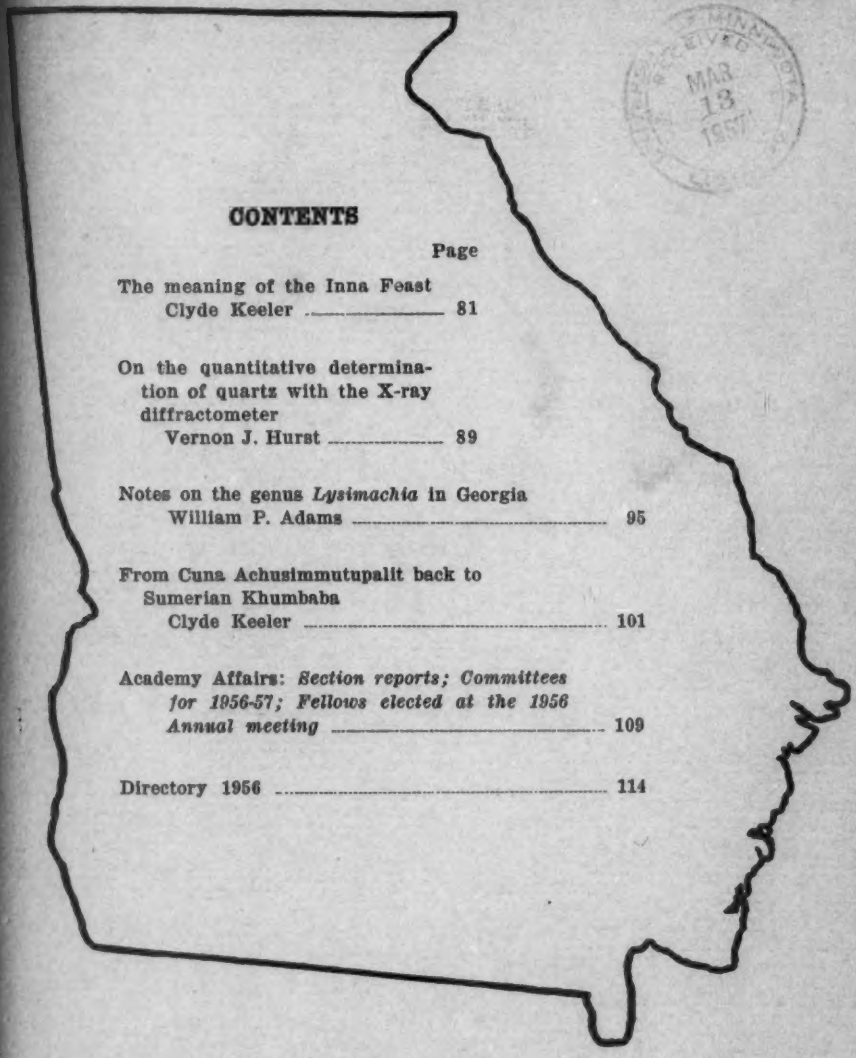

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THE MEANING OF THE INNA FEAST*

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In times past the inna or coming out party of the Cuna debutante took place at least a year after her puberty ceremony, but today there is a growing tendency to get the coming out party over with as soon as possible, especially if there are three or four girls in the family. This is done in order to distribute the heavy financial burden over a number of years, because several hundred dollars may be expended on a single feast in which the whole town must be fed for three days and everybody made drunk.

Nor can any father avoid putting on this feast if he is a member of the community because it is dictated by the town council, even though he be poor. And nobody's daughter can marry until her hair is cut ceremonially. However, this year I did see one girl who, because she was a poor orphan and could never marry if she went into debt for her feast by borrowing, was permitted to cut her hair during the feast of two other girls. Even this exceptional case was thoroughly argued pro and con at the Council Hall several times before the leaders of the town gave assent for the hair cutting sign of marriageability.

On a very small island the expense may not be so great, but in a community like Ailigandi, with its 1400 inhabitants and possibly 500 of these attending the inna, the expense is very high. In such large communities one finds occasionally today two related families or two neighbor families going together to honor a daughter in each family with a double ceremony. (See fig. 1). They must have a special kantule (high priest) for each girl, and each kantule must have his own assistants. However, there may be only one Iet (hair cutting woman) and inna enough to make the community drunk once. (See fig. 2). There is only enough food laid aside for feasting the community three days. So the real savings are on parched-corn sugarcane-juice beer, and on food.

In connection with the inna celebrations of each town there is at least one ceremonial drinking hall (the Capir Ipeorkun Neka), a permanent ceremonial cooking house (inna neka sokok) and a temporary ceremonial hair cutting shelter or surpa neka.

A great number of requisite food supplies must be procured in advance, and some of them may be very difficult to obtain. Thus, some Indian fathers may be collecting food for an inna for many months, and sometimes this preparation may go on for as much as a

* The present series of papers upon the primitive Cuna culture was made possible by grants-in-aid from the Rockefeller Foundation and for the summers of 1955 and 1956 from the Southern Fellowships Fund of the Council of Southern Universities.

FIGURE 1. *Mothers with their daughters for whom the Inna Feast is about to be given. Note the Order of Service Board in the background, the jars of Inna (sacred Water of Life), and the assistant to the Inna Sopet (Brewer) who is dipping out samples to be tasted for quality by the Inna Sopet. Between the foreground and the background stands the ceremonial river canoe in which the Inna must be mixed before putting in the jars to ferment.*

FIGURE 2. *Two Kantules (High Priests) and the Iet (Haircutting Woman), the highest officials of the Inna Feast.*

year and a half or two years. The meat animals collected are smoked and dried out and laid away on a rack over the cooking fire of the family.

When the prescribed foods have been assembled, the town officials set a tentative date several weeks ahead and the alcoholic inna is prepared. It is mixed in a ceremonial river canoe and set away to ferment for fifteen days. (See fig. 3).

The religion of the Cunas, as we have said, is a worship of the Great Earthmother in her role as a fertility goddess who set the pattern of bisexual reproduction long ago when she bore her children, including many of the plants, animals, men and even stars. For this reason the symbology of the inna feast, the most sacred of all religious observances, is highly sexual. The program of this feast recounts with chants, dances and pantomime the mystery of the origin of life by the sexual congress of the Earthmother, Olokukurtilisop, with the Sungod, Olowaipippilele. It describes with very frank details the events involved in the conception and foetal development of the girl being feted. It carries her life story up to date when, with the celebration of her inna feast, she is physically and socially ready to enact once more the eternal miracle of reproduction.

The inna dedicates a debutante's newly woven marriage hammock to its hallowed role in reproduction, and it must be remembered that fertility is a sacred gift of the gods. The inna dedicates a girl to the soul of god in the hair cutting portion of the ceremony. During the inna the girl is painted with sacred black saptur (fruit juice) to keep away devils that might destroy her between the inna and the time of her marriage. Saptur juice is sacred because the first saptur tree grew from the contents of the clay jar in which the Moon's sister, Olomakriai, put darkened blood from her menstruation. Olomakriai is an Earthmother. The inna feast presents the debutante with a sacred "Kammu name," which she guards as a religious secret throughout her life. Since the kammu represents god, a girl's kammu name is a secret between herself and god.

The inna feast is filled with sex and reproduction symbols. The most active symbol is the great kammu flute, made out of a large reed, representing the phallos of Olowaipippilele, the Sungod, and the Kantule who manipulates this flute acts as the proxy of the god. He is god for the period of the inna, and being god, of course he is the director of the ceremony. The clay incense pot in which cocoa bean incense is burnt during the ceremony represents the uterus of the Earthmother, and as such plays a relatively inactive role. Another symbol is the nasis calabash rattle with its koe deer leg bone handle. This rattle represents the Earthmother's uterus, and the deerbone handle symbolizes a child in the process of being born to the Earthmother. (New born babies are always called "koe" meaning little fawn.) (See fig. 4). Even the constituents of the alcoholic drink and their containers are sex symbols. The stalk of sugar cane represents the phallos of the Sungod in erection; its juice, god's semen. The parched and ground maize stands for the Earthmother's vaginal secretions.

The great clay jars in which the inna is fermented also represent the uterus of Olokukurtilisop, the Earthmother. The fermented inna is the Water of Life, that is, the water (amniotic fluid) shed by the Earthmother at childbirth when the Sacred Tree of Life (umbilical cord and foetal membranes) was cut down by the Sungod. A few cocoa beans have been added as "medicine" for the inna. This Water of Life flowed out to form all the oceans of the world. The amniotic fluid shed by a human mother bears the child into this world, and in like fashion by swallowing the spiritual inna feast Water of Life until drunk, one is actually born again into a new spiritual life, a foretaste of Heaven or the Afterlife.

The Cuna Indians say that if they do not become drunk at inna feasts on earth, they can never go to Heaven where there are both reproduction and inna feasts. The Indians, following Christian expressions of today, say that to get drunk at an inna feast "is Salvation," or that by becoming drunk "they are saved." They say they are "born again" at the inna feast.

There are a great number of dances or ceremonial units composing the inna, some of them essential and others optional. I collected a list of these from a Kantule in Achutuppu last year but have been unable to get a Kantule to talk to me further about this highly

FIGURE 3. *Olotiekindilappi the Inna Maker and his product.*

sacred matter. This year, however, I was able to get an explanation in Ailigandi from another Kantule's son, who had been let in on these religious secrets. The average Indian knows very little about the meanings of this ceremony.

I shall list and explain the essential units of the inna feast.

1) *Inna saiet ikar*. This is known as the preparation chant, because it describes the requisite foods and their necessary quantities that have been collected for the feast. It tells of the fish, dwarf deer, two kinds of peccaries, plantains, maize, cocoa beans, tobacco and sugar cane among other items. There must be four agoutis for a special sacrifice. There must be iguanas, representative animals of the underworld, encountered by the great Kammu of god when it went into the earth. The iguanas are called Kalis kammu or food of the Kammu. There must be a native warsuit tobacco cured in rope form. During this chant the men dance in a circle about the smoked and dried paws of the agouti. If there is not the right number of agoutis, there can be no inna feast and no inna saiet ikar.

2) Now comes a most interesting ceremony from the standpoint of sex symbology. The Kammu or god's phallos, the nasis calabash or uterus of the Earthmother and the koe kala or deer bone foetus in the act of being born are all painted with red makepa seed paint representing the Earthmother's blood. This wards off evil spirits that try to get into the inna hall and destroy the ceremony.

3) The *Nam neka* referring to the underground house in which the Earthmother develops her children (actually in her uterus), describes how the great Kammu or god's phallos is inserted into the vagina of the Earthmother and how the male and female fluids mix together.

4) *Kapet ikar* is the sleep dance performed by the Kantule and his assistant the Kamsuet. It relates how after their intercourse the Sungod and the Earthmother slept a while. The chant says that all the Sungod's semen has been expelled and that there is only water (urine) in the Kammu now.

5) *Pinya ikar* describes how the male and female fluids react together to form the simmur, seed or navel button that sprouts and grows into a Paluwall Tree of Life on which develops plants, animals and children, each attached to the tree by its navel. The Tree of Life represents the umbilical cords and foetal membranes. Pinya ikar is danced by the Kantule, the Kamsuet and their wives.

6) *Opet ikar* is usually placed here. The participants are overheated from the dances and the alcoholic inna that has been served freely from the great clay jars. Eight warsuit tobacco ropes are smoked, and the cheeks of the participants are painted with makepa (Earthmother's fresh blood). A nose line and check lines are drawn on the face with saptur (Earthmother's black menstrual blood). All those taking part, men and women together, now undress and walk out into the ocean to bathe in the Water of Life of the Earthmother.

7) For the joyful *onakwet ki namakke* new clothes are donned. The name of the dance means "Chant the feast up to heaven!" This

FIGURE 4. *A Kantule (High Priest) blowing on the Kammu Tummati (sacred symbol of God's Phallos), and shaking the Nasis (sacred symbol of the Earthmother's Uterus), holding it by the Koe handle (sacred symbol of a child in the process of birth).*

emphasizes the fact that the ceremony is sacred, and that in carrying it out the participants are praising god.

8) *Kwilet ikar* is a dance of pride in which Kamsuet and Tiset with their wives take part, as does the Iet woman who cuts the hair and the *Sia nar takket* who tends the incense pot. The pride of this dance may mean that pregnancy has been achieved in the ceremony and that the much desired child is eagerly awaited, because the Kammu does not take part. Its role in fertilization has been accomplished previously.

9) The *tatar nakwe* or chant to the rising sun is conducted by the Kantule and Kamsuet. It describes how Olowaipippilele the Sungod comes up in all his radiant splendor to mate with the Earthmother.

10) *Tatat arkwane* is a chant to the setting sun. It is a sequel to the previous chant and is likewise sung by the Kantule and the Kamsuet. It describes how Olowaipippilele takes leave of the Earthmother and resumes his journey.

11) *Purpake namakke,* performed by the Kantule and Kamsuet, means "singing to the spirit" (the foetus) and describes how the baby differentiates in the womb and is finally born. The rushing back and forth from the inna jars to the seated participants at the inna feast imitates the trips of the midwives to the medicine man and back to the expectant mother. The drinks of inna are interpolated by puffs of sacred warsuit tobacco smoke, an incense administered to their faces by acelytes who blow with the fire end of the rope in their mouths.

12) Now comes the most "dangerous" part of the inna, known as *kinki turken ikar* or shooting the disease devils. Myriads of evil spirits of disease try to crowd into the inna hall to injure or kill the participants just as they try to destroy the pregnant woman and her unborn child, and very often succeed. These peni devils must be driven away by burning much cocoa bean incense in the clay jar (sia nala) all night to keep the inna hall filled with smoke that the devils cannot tolerate.

13) There is a dedication of the debutante's marriage hammock which has been suspended on a wooden hook high above the people in the center of the inna hall. The wooden hook is painted with spirals of red and black. For the dedication it is let down, and the Kantule chants in it. On the ground under the head of the hammock stands the incense pot, and on the ground under the center of the hammock is placed the Kammu together with an opening-and-closing pocket knife by means of which the Kammu has been prepared. The knife is closed if the debutante has not yet menstruated but open if the young lady has already come to maturity. During this ceremony of dedication the Kantule first lies on his belly in the hammock to imitate (in his role as the phallos of god) its sacred reproductive function in marriage.

14) The *iet ikar* is the most sacred hair cutting ceremony, usually performed in a closed surpa in order that none but the actual par-

ticipants in the ceremony may witness it. The Kantule, the Kamsuet, the Sia nar takket, and the Iet woman are present. I witnessed most of this ceremony in a loosely built surpa neka shelter in Mulatuppu, but eventually I was driven away by the Kamsuet who said that if I witnessed any more of the service the debutante would die. A special roasted male dove of the mountains (ipia kwile) representing the "soul of god" is presented to the Kantule who eats its beak. Then he is similarly presented with the offering of a female dove. He eats its beak. After this he orders the Iet woman to clip the debutante's forelock (nu saikla or dovelock) which represents a bird's beak, a symbol of the bird form a person takes in Afterlife. Cutting the sacred saptur fruit is performed by the Iet woman, and the appearance of the cut section is predictive for success or failure of the marriage of the debutante.

15) During the inna there is a chant of blessing, *neki namakket*, upon the drinking hall (inna neka), the inna cooking house, (inna neik eskok), and the hair cutting hut (surpa nek).

16) Among the many other units that may be included in the celebration of an inna may be *ulu sipu tiwar* (the white river boat). It is sung by the Kantule and the Kamsuet and glorifies the soul boat (ulachui or ulu ikko) by which the soul leaves the cemetery on the bank of the local river for the region of the Afterlife.

17) The *nuka ki namakke* or "singing the name" ends the formal part of the inna feast. The Kantule in his chant bestows upon the saptur-black debutante her Kammu name which she must never reveal. It will be an ordinary Indian girl's name such as Ikwatopikilli.

Toward the end of the ceremony there is a place for the Kamsuet to shoot with bow and arrow at the head of a red rooster representing a great devil, possibly Olotuinkippe or Kokrikokippilele, who is trying to enter the inna hall and destroy the service.

After the formal service the celebrants will join in secular dances such as *neka koppe* (let us drink). They may include imitation dances such as mula (vulture), sulupak (eagle), and sulu (monkey).

Although the Kantule or High Priest enjoys prestige among his people almost equal to that of the first chief, and although he probably acquires some monetary benefits that are never mentioned publicly, ostensibly his pay for services at the inna feast is no more than a crude clay incense pot standing for the Earthmother's uterus and a piece of rope representing the umbilical cord. The incense pot has many secular and religious uses on earth, and the unbilical cord in its rope form is the "spirit bridge of the Afterlife."

ON THE QUANTITATIVE DETERMINATION OF QUARTZ WITH THE X-RAY DIFFRACTOMETER

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Abstract

When a powder barely finer than 200 mesh is scanned by an X-ray diffractometer at the rate 1°o /minute, the best expected accuracy of a quartz determination based on one measurement of peak height is ±10 percent if the quartz content is within the range of 10-60 percent. The accuracy of the determination is better when the quartz content is less than 10 percent. An over-all accuracy of ±5 percent is obtainable if three measurements on each of three mounts are averaged.

Introduction

The quartz content of slimes, dusts, clays and other mixtures containing more than one silicate is not determinable by spectrographic methods, nor by chemical methods except with difficulty. Petrographic methods are likewise unsuited when the quartz particles are very small, coated, or enclosed in other grains.

X-ray diffraction was early proposed for the determination of quartz in such materials (Bale and Fray, 1935). Walker (1936) used X-ray methods to determine the quartz in mine dusts, and reported an accuracy of ±5 percent. The Bureau of Mines (Ballard, Oshry, and Shrenk, 1940) investigated the determination of quartz in several other materials, and reported similar accuracy. In these investigations, diffraction intensities were measured on microphotometer tracings of X-ray powder patterns. Carl (1947) used a recording X-ray diffractometer: averaging five measurements from each of five mounts per sample and using minus 325 mesh powder, he obtained limits of error of ±5 percent for the samples containing more than 10 percent quartz, and ±1 percent for the samples containing less than 10 percent.

During routine work with an X-ray diffractometer it is often convenient to use powder somewhat coarser than 325 mesh (finer than 200 mesh) and to scan at a rapid rate (1°20* /minute). The work described below was carried out to determine the limits of error under these conditions.

Procedure

Ten mixtures containing 5, 9, 14, 20, 25, 30, 33.3, 40, 50, and 60 weight percent of quartz were prepared by mixing weighed quantities of quartz and sericite ground to pass a 200 mesh screen. Three cell mounts of each mixture were prepared, and on each mount at least three measurements were made of the heights of the (112), (102), and (100) quartz peaks, using Cu Kα radiation. Instrument settings were 35KVP, 10mA, scanning speed 1°20* /minute, time constant 4 seconds, angular aperture 1°, receiving slit 0.006″.

* 2 degrees theta per minute.

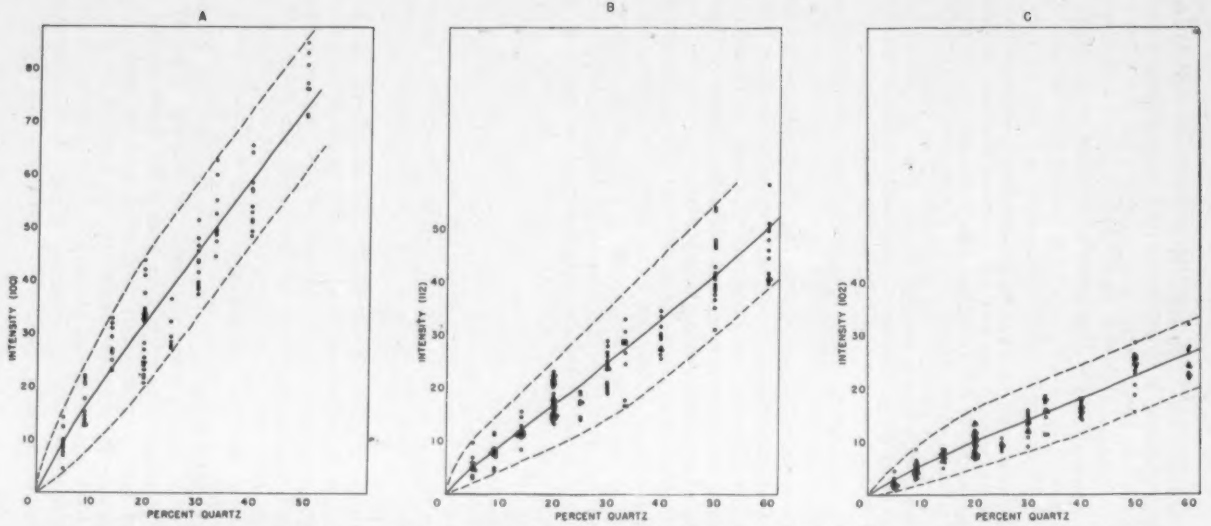

FIGURE 1. *Diffraction intensity versus composition. A.* 98 *measurements of the* (100) *quartz peak made on* 28 *cell mounts. B.* 137 *measurements of the* (112) *quartz peak made on* 33 *mounts. C.* 129 *measurements of the* (102) *quartz peak made on* 33 *mounts.*

Results

Peak height, as measured on the diffractometer tracings, is plotted against quartz content in figure 1. The accuracy with which peak height can be related to quartz content is limited by the slope of the solid curves and by the horizontal distances between the dashed curves, which are an indication of the amount of statistical error in the procedure. The curves show that a single rapid measurement of the (102) peak height gives the quartz content with ± 8 percent for a sample containing about 10 percent quartz, while a measurement of the higher (100) peak gives the quartz content within ± 6 percent. Measurement of these two peaks on a sample containing about 40 percent quartz gives accuracies of ± 15 and ± 10 percent respectively. The accuracy of the determination thus increases as the quartz content decreases, and the most intense peak (with the greatest measurable intensity) gives the highest accuracy.

Figure 2 shows the spread of points obtained by averaging 9 measurements on 3 different mounts of each composition. By this procedure the statistical error is reduced as much as two-thirds, and an accuracy of ± 5 percent is attainable over the entire range of compositions. To prepare a mount and measure the height of one peak takes about 5 minutes; to prepare three different mounts and make three measurements on each takes about 20 minutes.

On Reducing the Statistical Error

The statistical fluctuation of the incident X-ray beam is a principal source of error in intensity measurements made over a small time interval, as when scanning at the rate 1°20* /minute. The magnitude of the error, however, depends only upon the total number of quanta counted, and it can be reduced to the vanishing point by sufficiently increasing the count. Figure 3, adapted from Klug and Alexander (1954), P. 273, shows what counts are necessary to attain a given precision in peak intensity for various ratios, R, of total to background counting rate. A quartz-sericite mixture containing 5 percent quartz, for example, gives about 400 counts at the top of the (100) quartz peak; the ratio of total to background counting rate is about 1.6; the probable error due to fluctuations in the incident beam, as seen in figure 3, is 11.5 percent. To reduce the error to 1 percent it is necessary to take 60,000 counts at the top of the (100) peak. This corresponds to a counting time of about 25 minutes.

Particle size is a second factor that may greatly affect the accuracy of intensity measurements. With increasing coarseness, the number of crystallites in a sample decreases, and even though there may still be a statistically random distribution of the crystallites among all possible orientations, the total number having any one orientation becomes small as compared with the variation in number from one orientation to another. Thus the number of crystallites contributing to each reflection becomes insufficient to generate repro-

* 2 degrees theta per minute.

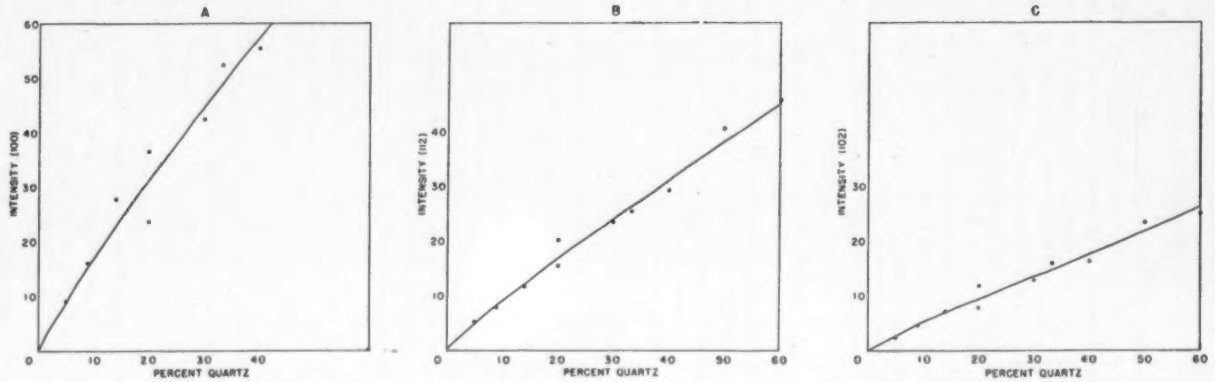

FIGURE 2. *Diffraction intensity versus composition. Each dot represents the average of 9 measurements (3 measurements on each of 3 mounts).*

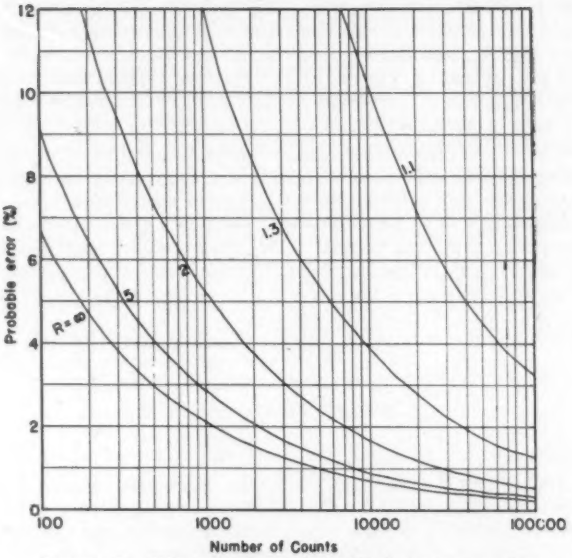

FIGURE 3. *Theoretical relationship between number of counts and probable error for various ratios, R, of total to background counting rate. (Adapted from Klug and Alexander,* 1954).

ducible diffraction signals, and intensity measurements made on successive mounts of the same mixture differ. Figure 4, adapted from Klug and Alexander (1954, P. 294), indicates the order of dependence of intensity variations upon crystallite size. The reproducibility of intensity measurements varies not only with crystallite size and the linear absorption coefficient, u, as shown in figure 4, but also with the experimental setup and several other factors, among them the multiplicity factor of reflecting planes, the degree of crystallinity of the specimen, and amount of powder irradiated. However, crystallite size and the linear absorption coefficient are the dominant factors. The calculated u for quartz is about 93 (Henry, Lipson & Wooster, 1953), for sericite 118. The men deviation in diffraction intensity in a quartz-sericite mixture finer than 200 mesh is thus at least 15 percent. To reduce the mean deviation to less than 1 percent, the particle size of the powder must be less than 5 microns.

CONCLUSIONS

For a powder barely finer than 200 mesh scanned at the rate 1°20* /minute, the best expected accuracy of a quartz determination based on one measurement of peak height is ±10 percent if the quartz

* 2 degrees theta per minute.

content is within the range of 10-60 percent. The accuracy is better if the quartz content is less than 10 percent. An over-all accuracy of ±5 percent is obtainable if three measurements on each of three mounts are averaged; to attain this accuracy from one measurement of peak height, it is necessary to use powder finer than 25 microns, and to take a count sufficient to eliminate the statistical error due to fluctuation in the intensity of the incident X-ray beam.

Although these conclusions specifically apply only to quartz-sericite mixtures, they are approximately true for other materials, as many clays and shales. On materials that have a higher linear absorption coefficient and give a higher background count, especially on materials that give overlapping peaks, the best expected accuracy is less than that reported here.

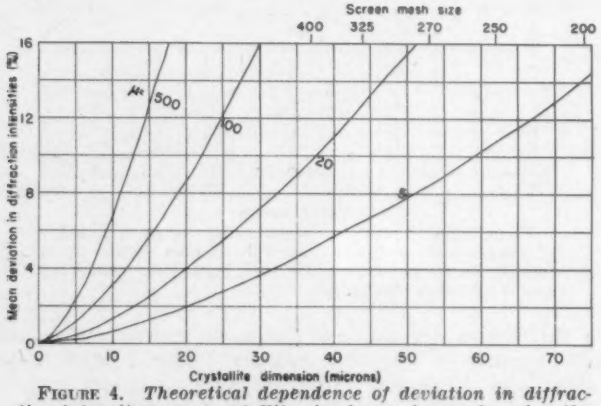

FIGURE 4. *Theoretical dependence of deviation in diffraction intensity upon crystallite size for various value of u, the linea absorption coefficient. (Adapted from Klug and Alexander,* 1954).

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Professor J. D. H. Donnay of The Johns Hopkins University, Baltimore; Dr. Gabrielle Donnay of the Geophysical Laboratory, Washington, D. C.; and Dr. A. S. Furcron of the Georgia Geological Survey, kindly read the manuscript and made several helpful suggestions.

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NOTES ON THE GENUS LYSIMACHIA IN GEORGIA

William P. Adams
University of Georgia

Members of the genus *Lysimachia* (commonly called "loosestrifes") are rather showy, attractive plants with yellow flowers and belong to the Primrose family (Primulaceae). Loosestrifes are generally found growing along stream banks, in damp rich woods, and in open meadows. They have recently been the subject of a taxonomic revision by James F. Ray, Jr. (1956). This work, however, is not readily accessible to the wild-flower enthusiasts and biologists of this area.

About six members of this genus of plants occur in the state of Georgia, especially in the Piedmont and southern Appalachian physiographic provinces. Herbarium specimens from three herbaria in North Carolina and one herbarium in Mississippi were among the material studied by Ray. Herbarium material from other southeastern institutions, including the considerable amount on deposit in the Herbarium of the University of Georgia, was not utilized in his study. Only 35 localities for *Lysimachia* are given for Georgia by Ray. Collections in the University of Georgia Herbarium alone add 31 localities and improve considerably the distributional picture in Georgia. These specimens may not alter the concept of any of the species but it would seem that Ray's treatment would have been greatly improved by study of as much herbarium material from this area as is presently available.

Ray's citations and the additional county records from the Herbarium of the University of Georgia are presented on the accompanying distribution maps. These maps will give the reader some idea of where these plants may be found and also assist him in finding new localities where the loosestrifes may grow. A simplified key to the species has also been prepared and is presented below. This key should enable quick identification, even though the "botanizer" possesses only a hand lens. Herbarium specimens were employed in the preparation of the key but the works of Fernald (1950), Gleason (1952), and Ray (1956) were very helpful in the selection of useful

taxonomic characters. The nomenclature recognized by Ray is followed here.

Key to *Lysimachia* in Georgia

1. Leaves with black glands or dots on the leaf surface (punctate).
   2. Stems creeping, often forming mats; leaf blades roundish. *L. nummularia*
   2. Stems erect, often 2 to 6 feet tall; leaf blades not as above, linear, lanceolate, to lanceolate-elliptic.
      3. Leaves linear to narrowly elliptic; flowers in terminal clusters (racemes) which are usually less than about 1 to 2 inches wide. *L. loomisii*
      3. Leaves elliptic to broadly lanceolate; flowers either in terminal clusters (panicles) which are more than about 2 inches wide, or on long stalks (pedicels) in the leaf axils.
         4. Flowers in terminal clusters (panicles); calyx lobes dark glandular-margined; corolla lobes yellow, *without* scattered dark streaks. *L. fraseri*
         4. Flowers on long stalks (pedicels) in the axils of the leaves; calyx lobes not as above, but with dark glandular streaks scattered over the surface of the lobes; corolla lobes with scattered conspicuous dark streaks. *L. quadrifolia*
1. Leaves without black glands or dots (epunctate).
   5. Leaf blades narrow-lanceolate, linear, or elliptic; not rounded or subcordate at the base. *L. lanceolata* ssp. *lanceolata*
   5. Leaf blades ovate to ovate-lanceolate; bases rounded or subcordate at base.
      6. Leaf petioles smooth, or with several long hairs (ciliate) only at base.
      6. Leaf petioles with conspicuous hairs (cilia) to the base of the leaf. *L. ciliata*

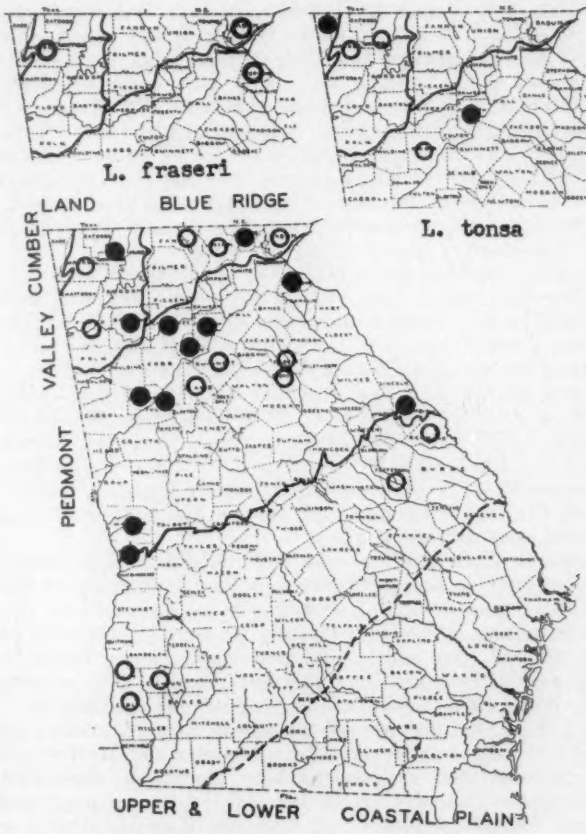
Notes and New Localities

L. nummularia L. This distinctive loosestrife is an introduction from Europe. It is apparently not abundant in Georgia, the only stations known at present being in and near Athens. In 1900 Dr. Roland Harper reported this plant as being "very abundant in open meadows along Tanyard Branch in Athens." Eight years later it was collected at this locality by J. M. Reade. Both Marion B. Duncan (in 1941) and Dr. Wilbur H. Duncan (in 1956) collected it on the edges of an ox-bow lake along the North Oconee River about five miles south of Athens. Dr. Duncan reports it as being in scattered clusters around the wooded edges of this lake. This species is quite common as a "lawn weed" in the Oconee Cemetery in Athens. *L. nummularia,* or "moneywort" as it is commonly called, should be

looked for around springs, on shady stream banks, river flats, and other moist situations.

New county record: CLARKE CO., near "Tanyard Branch," Athens, *J. M. Reade* May 1908; ox-bow lake on North Oconee River below Whitehall about 5 miles south of Athens, *Duncan 20080.*

L. loomisii Torrey. Ray reported this species from Bibb County only, on the basis of a specimen collected prior to 1837. The nearest station to this (according to Ray) is in Berkeley County, South Carolina. Collectors in the Macon-Augusta area should watch for this plant in order to ascertain whether this species should still be considered as a member of the flora of Georgia. According to Ray, it



L. lanceolata ssp. lanceolata

Dots - U. of Ga.; Open circles - Ray, 1956

grows in savannas, ditches, and sandy pinelands and flowers June through August.

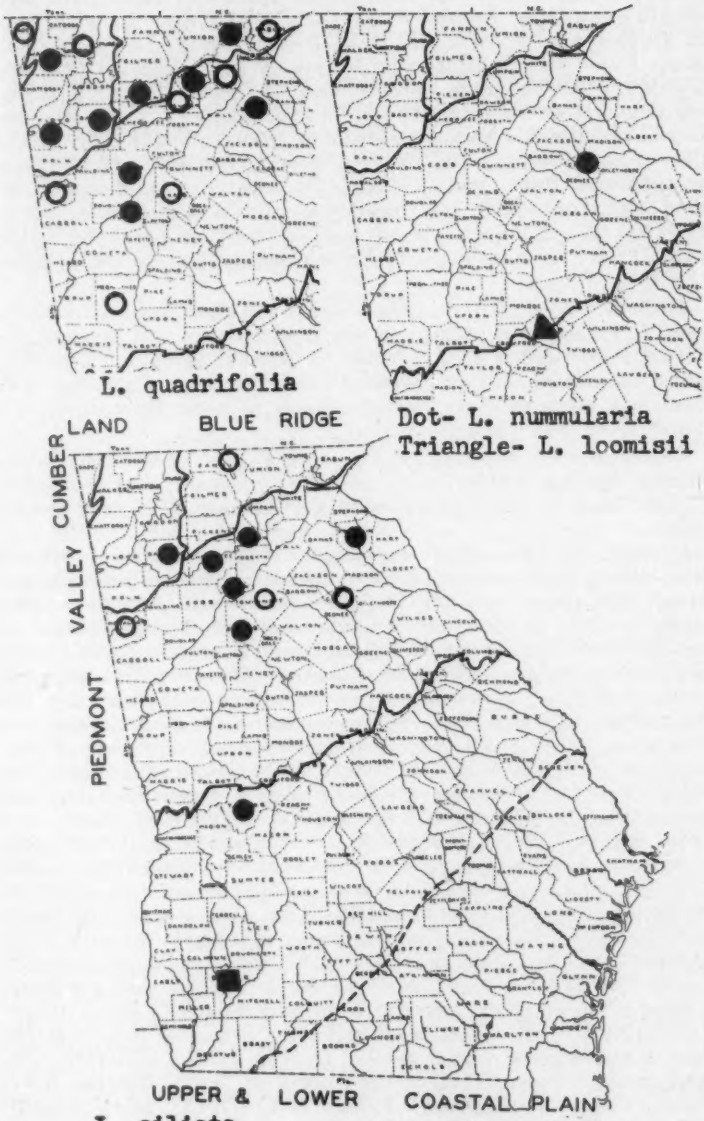
L. fraseri Duby. This species is probably the most attractive loosestrife in Georgia. Its large yellow flowers in wide terminal clusters (panicles) and its whorled leaves make this plant very conspicuous. It appears to be rather rare in Georgia, however, being reported only from Lookout Mountain and from Rabun and Stephens counties in northeast Georgia. *L. fraseri* generally grows in moist soil of wooded slopes, along stream banks, and occasionally on roadside banks and flowers June to August.

L. quadrifolia L. This attractive plant is commonly known as "whorled loosestrife" in allusion to the whorled leaves. Other than *L. lanceolata* this species is probably our most common loosestrife here in Georgia. It may be found growing in dry, open woods, on slopes and along roadsides and flowers from May through August. A similar species, *L. terrestis* (L.) BSP, may occur in Georgia, as Ray reported it from just across the state line in Cherokee County, North Carolina. He distinguished it from *L. quadrifolia* "by its opposite or subverticillate, rarely alternate leaves which are glaucous beneath, and by the terminal raceme bearing flowers with rotate corollas." Collectors in the Blue Ridge-Blairsville area should watch for *L. terrestis*. Ray remarked that this species occupies wetter habitats than does *L. quadrifolia*.

New county records: BARTOW CO., Quicksand, Pond, 4.8 miles East 35 degrees south of Adairsville, *Duncan, Venard, and McDowell 12407;* BANKS CO., along bank of middle fork of Board River near Habersham County line, *Duncan 5269;* COBB CO., about 1 mile southwest of bridge over Chattahoochee River at Pace's Ferry Road, *Venard and McDowell V-344;* FLOYD CO., Big Texas Valley, Mt. Berry, *Jones 621*; FULTON CO., 2973 Habersham Road, Atlanta, *Darby 224;* LUMPKIN CO., in Rock Creek area near Hawk Mt., *Crockford 17;* PICKENS CO., northeast of Jasper, elevation 1800 feet, *Duncan 6296;* TOWNS CO., Brasstown Bald, *Duncan 1455;* WALKER CO., 4.2 miles north 59 degrees east of LaFayette, *Duncan, Venard, and McDowell 12485.*

L. lanceolata Walt. ssp. *lanceolata*. While most of the other loosestrifes occur only in the northwest and Piedmont areas of Georgia, this subspecies may be found occasionally as far south as the Fall Line and extreme southwestern Georgia. It usually occurs on stream banks, in ditches, open woods, and occasionally along roadsides. Its flowering period is from June through August. Ray reported *L. lanceolata* from near Louisville and Augusta. It is likely to "turn up" along the Fall Line around the Macon area. A similar species, *L. quadriflora* Sims, was reported from Douglas and Murray counties by Ray. He separated it from the very similar *L. lanceolata* ssp. *lanceolata* by the lateral veins of the leaves being obscure and the leaves firm. The Georgia material, however, suggests that *L. quadriflora* may not be specifically distinct.

New county records: BARTOW CO., 0.5 mile south of Rowland Springs Church, 3.8 miles north 14 degrees west of Allatoona Dam,



L. ciliata Square- Thorne, 1954

Dots- U. of Ga.; Open circles- Ray, 1956

Duncan 8615; CHEROKEE CO., 7.25 miles east 25 degrees south of Allatoona Dam, *Duncan 8318;* COLUMBIA CO., 3.2 miles south 31 degrees west of Clark Hill Dam, *Duncan 10953;* DOUGLAS CO., about 1 mile east of Villa Rica, *Duncan 9678;* FORSYTH CO., Sawnee Mt., near Cumming, *Venard and McDowell M-126;* FULTON CO., vicinity of Atlanta, *Darby 37;* HARRIS CO., along Standing Boy Creek, directly north of Columbus, *Duncan 9665;* MUSCOGEE CO., along tributary of Heiferhorn Creek, 10 miles north of Columbus, *Duncan 9657;* STEPHENS CO., northwest of Curahee Mt., elevation about 1300 feet, southwest of Toccoa, *Duncan 11202;* TOWNS CO., 2 miles south of Neel's Gap, *Duncan 1452;* WHITFIELD CO., 7.8 miles south 43 degrees west of Tunnell Hill, *Duncan 12568.*

L. tonsa (Wood) Kunth. In contrast to the other loosestrifes of this area, *L. tonsa* grows mainly on dry, rocky slopes and in open, dry upland woods. It has been collected on Lookout Mountain, near Kennesaw Mountain, and on Sewanee Mountain near Cumming. This plant may occur on other such mountains in north Georgia. It is in flower from May through August.

New county records: DADE CO., west side of Lookout Mt., above Sulphur Springs Station, about halfway to summit, *McVaugh 8998;* FORSYTH CO., near top of Sawnee Mt., elevation 1900 feet, *Duncan 3623.*

L. ciliata L. This rather showy plant may be found growing in damp woods, along stream banks, in meadows, and bottomlands, and occasionally along roadsides. It flowers from early June to August. In Ray's study of the genus a single record of this species was reported from "West Florida." A station near Newton in Early County for *L. ciliata* was reported by Dr. Robert F. Thorne (1954). Ray does not mention seeing this specimen, however. In the Herbarium of the University of Georgia there is a specimen of *L. ciliata* which was collected in "rich woods, near a stream" north of Reynolds (Taylor County) by Mr. Joseph H. Pyron. Wild-flower enthusiasts and biologists, when in southwestern Georgia, southern Alabama, and western Florida, should watch for this apparently rare plant.

New county records: BAKER CO., along Cooleewahee Creek 1 mile northeast of Newton, *Thorne 5060* (reported by Thone, 1954); BARTOW CO., along east side of Allatoona Creek about 0.25 mile from Etowah River, *Duncan 8267;* CHEROKEE CO., along Little River, near Cherokee Mills, 7.5 miles southwest of Canton, *Duncan 8332;* DAWSON CO., on Chestatee River, 1.3 miles south of Lumpkin County line, *Duncan and Adams 19022;* DEKALB CO., northwest of intersection of North Decatur Road and Briarcliff Road, *Driver 31;* FRANKLIN CO., along small tributary of middle fork of Board River, 4 miles south of Carnesville, *Duncan 11305;* FULTON CO., marsh west of Briarcliff Road and north of North Decatur Road, Atlanta, *Venard and McDowell V-368;* TAYLOR CO., 10 miles north of Reynolds, *Pyron 501.*

The suggestions and criticism of Dr. Wilbur H. Duncan are greatly appreciated.

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FROM CUNA ACHUSIMMUTUPALIT BACK TO SUMERIAN KHUMBABA[1]

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Last winter in going over my field notes of six summers on the Caribe Cuna religion I became aware that the monsters guarding their Paluwalla Tree of Life are not just the horrible creatures they are said to be. It occurred to me that possibly the Great Snake is a phallic symbol of the creative power of Olowaipippilele the Sungod. The huge Frog or Toad is most likely to be Kwelopunyai, the Earthmother's midwife. It appeared probable that the blood curdling, shaggy-bellied monster, Achusimmutupalit, is the placenta, umbilical cord, and foetal membranes shed by the Earthmother when she bore her children. These three monsters were slain by Puksu, the Morning Star (figure 1), so that Olowaipippilele, his brother, could cut down the Paluwalla Tree (sever the umbilical cord). The umbilical cord and foetal membranes, I had learned previously to be the Paluwalla or Saltwater Tree of Life expelled by the Earthmother, Olokukurtilisop, the Giant Luminescent Blue Butterfly Lady, when she gave birth to most of the animals, plants and man.

Interestingly enough, my present visit to the Cunas (1956) has shown that these assumptions are correct. This verification of the meaning of the Paluwalla symbols allows us to go much further. In fact, it permits us to trace Achusimmutupalit back to its Sumerian-Akkadian counterpart.

In a previous paper I have demonstrated that the Sumerian-Akkadian Tree of Life association of symbols is the scene of a Mons veneris, or wooded mountain (the Earthmother's pudenda), surmounted by a lake (the Earthmother's vulva) with a most gigantic

1. These researches were made possible by grants-in-aid from the Rockefeller Foundation and the Southern Fellowship Fund of the Council of Southern Universities.

FIGURE 1. *Puksu the Morning Star killing Achusimmutupalit with bow and arrow.*

tree beside it (the Tree of Life representing the umbilical cord and the foetal membranes). A sacred river or several sacred rivers (the amniotic fluid or Water of Life) flow from this lake to form all the oceans of the world much as in the Bible story. The Cuna version says that some of this saltwater of the oceans is insinuated again by the friendly whales into the wombs of all pregnant women and higher animals. At Mulatuppu I was told that the Tree of Life of a woman develops from a simmur or seed or umbilical button or sprout. This seed arises from a mixture of male and female secretions. The Tree of Life grows within the mother and on it within the sakki or net (foetal membranes) the child differentiates, attached to the Tree of Life by its navel.

Only the Cuna priesthood (seers, high priests and variously specialized medicine men) know and understand these symbols. Especially is their true meaning kept hidden from the children and adolescents, often by deceptive explanations. Fortunately for my studies, my seven years of patient questioning of the Cunas about religious matters finally paid off. Some of the medicine men were convinced that I was truly interested and sympathetic toward their way of life and that I had no intention of exploiting them. I was able to gain the confidence of Olowitikinya, a medicine man of Mulatuppu, who knows the medicine pictures of the chant, Mu ikar, which has to do with pregnancy and childbirth, and recounts much concerning the childbearing of the Earthmother who established the great prototype for the sexual reproductive process.

I always framed my questions by saying that a certain thing was believed in the ancient Sumerian, Hittite, Greek, Roman, Aztec, Incan or Mayan religion, which I suspected might also be true of the Cuna religion, and then I would ask my informants if it is the same in the Cuna religion. My guesses through inference were so often correct that Olowitikinya told me that I knew so much about his

religion that I ought to be able to roll the red hot spearpoint (Machiolosuilipippilele) between the palms of my hands without being burned and to be able to handle venomous snakes without being bitten. However, I am glad he did not insist that I undergo the rigorous Cuna test of religious knowledge by fire and poison. Olowitikinya even suggested to a local group of the inner sanctum that in view of my extensive knowledge of Cuna religious and medical secrets I should have the medicine name of Olotiekippi, chief of the balsa medicine dolls, helper and friend of the Sungod, Olowaipippilele. Without such esteem among the guardians of their religious secrets, this paper could not have been written.

I knew that in Heaven there is a grove of sacred saptur trees (derived originally from the menstrual blood of Olomakriai, an Earthmother, wife of the Moon-god Olotwalikippilele), and among these trees there wander two sacred monsters said to be Achusimmutupalit and Achunipali (the carnivore monster of heaven). Upon careful qusetioning, I learned that these two monsters are identical. Unfortunately, the translation of an early scientist had made them into different beings and had interpreted Achusimmutupalit as "un esfinge que tiene cadena de oro." This left the monsters shrouded in mystery and inaccuracy.

Olowitikinya drew for me two pictures of Achusimmutupalit from his Mu ikar and these pictures with their explanations left no doubt as to the identity of that creature. In both pictures he glorified Achusimmutupalit, in one on top of the Paluwalla Tree (figure 2), and the other on top of the house of Olokukurtilisop, Earthmother consort of the Sungod (figure 3).

José, the son of Saikla Ikwaniktipippi, was astounded when he heard that I knew the meaning of Achusimmutupalit. He asked, "Who told you about Achusimmutupalit? The medicine men never give out the secret of Achusimmutupalit! My father will never tell you that secret."

As predicted, Ikwaniktipippi refused to divulge the secrets but I questioned others a great deal about Achusimmutupalit and was informed that there is a place called Sapsur on the coast of Columbia where many shells of sea turtles are strewn about. These are the victims of Achusimmutupalit and the Indians are afraid to go ashore there even in the daytime. Tator Ikwanikinappi tells me he lived for two years at Paya and Tapalisa near the sacred mountain, Tacarcuna (site of the Earthmother's genitals). He swore that he had seen on top of that mountain an enormous inclosure containing many wonderful medicine plants, tapirs, mountain pigs, jaguars and colossal Achusimmutupalits.

The ordinary food of Achusimmutupalits consists of wetera and yannu (two types of mountain peccary), koe (deer), yauk (sea turtles), moli (tapirs), yar morro (mountain turtles), achu sappur (mountain cats) and anteaters. However, I have reported elsewhere that the Cunas are terrified by the thought of this mythical animal that often eats Indians who have been caught in the mountains after dark.

Once upon a time one of the Tatakana (grandfathers, gods, demigods, ancestors) saw an Achusimmutupalit in the water of a great river (actually the River of Life) that flowed down from Mount Tacarcuna. He (probably Puksu, the Morning Star) tried to shoot it with his bow and arrow, but he could not get near it. This was because it had coiled up on its belly an umbilical cord with a golden sakki or net (the foetal membranes) on the free end of the umbilical cord, and every time Tator got close enough to draw his bow the Achusimmutupalit would shoot out the golden net to catch him, so that he always had to run for his life. Next day Tator found the Achusimmutupalit dead on the bank of the river. He examined it. It had the shape of a tapir but was many times larger. It had very

FIGURE 2. *Achusimmutupalit (the placenta) standing on the Palluwalla Tree of Life (the umbilical cord). Note the Olokwilotupa (the umbilical cord) hanging from the belly of Achusimmutupalit, and the Sakki net (foetel mambranes). Various sacred plants including long vines grow on the Paluwalla.*

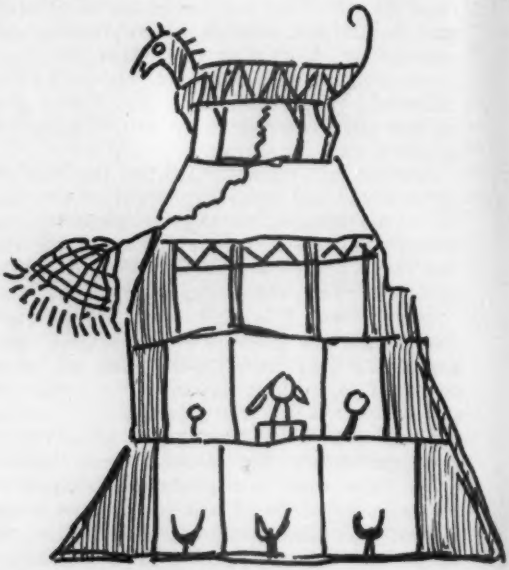

FIGURE 3. *Achusimmutupalit (placenta) with long Olokwilotupa (umbilical cord) and Sakki (foetal membranes) standing on top of the Mu Neka (Earthmother's house, really her womb in the earth). Three pictures of the Earthmother's womb are shown in lower compartments. In center compartment is shown the Earthmother standing on her 3-legged bed. On either side of the Earthmother is represented the Simmu (sprout) formed by the mixing of male and female sex fluids, and from which animals, plants and man develop.*

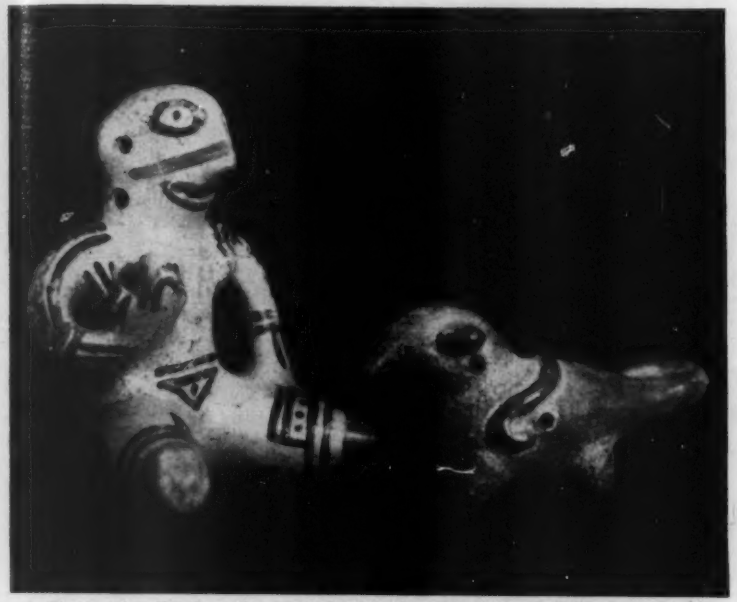

FIGURE 4. *Earthmother nad Child, also whistle consisting of a Tapir with Umbilical Cord (Achusimmutupalit). The cord reaches to the tapir's tail. Note enormous wedge-shaped nose of Earthmother like that of Enkidu on certain roll seals of the Near East. Both grave votives from Coclé, photographed by permission of Dr. Mendez, Director of the Museo Nacional.*

sharp teeth that were blood red. It had the long snout of a tapir. A whistle in the Museo Nacional is in the form of a tapir with an umbilical cord draped over its back, (see figure 4).

The identification of Achusimmutupalit here with a tapir caused me to recall the profile of the dragon out of whose mouth the water lily grows, the stem of which is being climbed by the so called "diving god" of Guatemala and Southeast Asia (actually Gilgamish and the Plant of Life idea). An examination of tapir skulls kept by the Cunas as medicine makes it almost certain that the models for the heads of the diving god "monsters" were tapirs or Achusimmutupalits (meaning the placenta to the Cunas). The lotus stem is the umbilical cord and the blossom is the foetal membranes. Tapirs are particularly fond of swamps and ponds where the lotus abounds. Curiously enough, tapirs are geographically restricted to Southeast Asia and to Central and South America.

This identification of the lotus as the foetal membranes is the "secret of the lotus" in India and the symbology of the "lotus of eternal life" in Egypt. The picture of the "Birth of Brahma" makes this identification certain for India. In the Volcan district

of Western Panama Gerald Doyle excavated a deep burial in which the only artifact, aside from a shell pendant and a badly disintegrated skeleton, was a terra cotta lotus vase. The man had been buried lying on his back with legs extended and with this precious symbol of eternal life clutched to his breast.

A terra cotta figurine excavated in the Volcan area of Panama by Mr. and Mrs. Monte Fullerton shows the Earthmother with a child. She holds one arm about a monkey whose tail becomes a root of the Tree of Life. Thus, the monkey can be a symbol of Achusimmutupalit, the placenta monster. Stirling's Izapa monument no. 5 shows in the Tree of Life complex a monkey holding an umbrella. In view of the Fullerton figurine, we may suggest that the Izapa monkey may represent the placenta, the handle of the umbrella may symbolize the umbilical cord, and the umbrella proper may stand for the foetal membranes.

A golden pendant representing a monkey in the National Museum of Panama shows an umbilical cord joining the tail, with a number of small animals (monkeys?) sitting on the tail.

The Pueblos and other North American Indians living where there is little water seem to have adapted the Chilli-coyote or sacred squash symbology from the tapir symbols. The Chilli-coyote (sacred squash of Coyote, the son (?) of the Sungod) is a symbol of wide distribution in North America, and its name is preserved in such sacred place names as Chillicothe, Ohio, where there were great worship mounds, one of them dedicated to the Great Snake. The sacred squash vine grew out of and around the hole in the ground from which people emerged from the Earthmother's uterus by climbing its stalk, much as the "diving god" climbed the lotus stalk. The golden flowers of the sacred squash are worn as a fertility symbol over the ears of Pueblo girls who have come to maturity. I am not certain at this point whether the Coyote, found in this Pueblo birth scene associated with the sacred squash vine, represents the Earthmother (Olomakriai of the Cunas), her son (Olowaipippilele), or Achusimmutupalit. I am inclined to think, because of constant reference by the Cunas to a carnivore-like animal, when speaking of Achusimmutupalit, that Coyote is Achusimmutupalit.

In the Eddas there are various references to Yggrasil, the Tree of Life, the name of which indicates that it is the Ash of Odin's Horse. It is said to be evergreen and is represented in North England by excellently preserved crosses, the carvings on which may show an eagle, squirrels and serpents eating the fruit of the tree. Yggrasil grows beside a spring—and honey dew comes from the tree. Gods give judgments at Yggrasil and Thor walks there. Serpents beneath the tree gnaw at its branches. The trunk of the tree is said to be rotting, and Nidhogg (nether hog monster with a long nose) gnaws at its roots. Nidhogg is evidently Achusimmutupalit.

The Tree of Life in the "Nimir's Tree" story bears fruit which, when eaten, is good for women in childbirth. "What was within then comes out."

Certain rivers sprang from near Hell-gates, one named Gjoll. It is under the root of the ashe Yggrasil which stands over Niflheim.

It is a mighty fate tree with its roots extending deep into the earth, and it extends up through nine worlds. Because of its name Yggrasil is the Tree of Odin's Horse. Yggrasil may also be Achusimmutupalit.

The Greco-Roman and Neareastern counterparts of Achusimmutupalit require some consideration. The Biblical monster guarding the Tree of Life in the Garden of Eden is a cherubim or cherub undoubtedly derived from such a composite creature as depicted in Babylonian and Assyrian temple sculptures, often having parts of a bull, a lion, an eagle and a man. Several descriptions of these monsters are given in I Kings and Ezekiel. Sometimes there are four heads in Biblical descriptions.

In I Kings 6:29 we read "And he carved all the walls of the house (Solomon's Temple) round about with carved figures of cherubim (Achusimmutupalits ?) and Palm Trees (Paluwallas) and open flowers (foetal membranes) within and without."

"Flowers of lilies" were cast on the Brazen Sea and the bronze laver carts. These were all fertility symbols in Babylon.

Ezekiel 7:18 records "And it was made with cherubim and palm trees, so that a palm tree was between a cherub and a cherub, and every cherub had two faces." The faces of these cherubs were those of a lion and a man. In Roman mythology the name and character of the Monster Cerberus, who guards the entrance to Hell, Tree of Life (?), (the Earthmother's uterus to which the dead all return), is derived from the same source as the Hebrew Cherubim.

In very early Mesopotamian times the Tree of Life was not a palm tree, but a weeping willow. Then it became a Cedar of Lebanon and later a date palm. Elsewhere it became the pommegrante, the opium poppy, the blue spruce, the white cedar, arbor vitae, the sacred fig. In America it turns up as the corn plant, the cedar and even the white oak.

One may object to several symbols representing the same sex idea in the same culture, but this is not an uncommon state of affairs among the Cunas. The Cunas have a number of paired symbols representing the reproductive structures of the two sexes. The Mu akwa or maize grinding stone represents the Earthmother's uterus, while its pestel stone is considered as the phallos of God. Other sex symbols are quite apparent at the Inna Feast or Coming Out Party of the Debutante in which a deer leg bone inserted into a hole in a calabash forms a rattle for the Kantule or High Priest, but in this service it also represents a child in the acting of being born from the Earthmother's uterus. The reed flute of the Kantule at the Inna Feast represents the phallos of God in erection. It is always tied to the rattle with a string or twine representing the umbilical cord. At the beginning of the Inna these objects are painted ceremonially with red makepa seed paint, representing the blood of the Earthmother, to ward off devils who are trying to enter the Inna Feast Hall and destroy the ceremony. As pay for his services at the Inna Feast, the Kantule receives a sia nala incense pot representing the Earthmother's uterus and a piece of rope representing the umbilical cord. Sugar

cane symbolizes God's phallos in erection, and its expressed juice, God's semen. Crushed maize in water is the secretion of the Earth-mother's uterus. When these two fluids are mixed and fermented, the intoxicating result is the Water of Life, capable of transporting one's soul to the new spiritual life of Heaven.

When one looks for parallels to Achusimmutupalit in India one finds that the tapir changes to an elephant which holds in his trunk a lotus stem bearing a flower. It was in this form that Buddha in his Guatama avatar began his intrauterine development in the womb of Queen Maya. One Midsummer night he came from heaven in the form of a tiny white elephant holding a blue lotus in his trunk. In this form he insinuated himself into the generative organs of Queen Maya, as she slept. Queen Maya is the name of the Hindu Earthmother, and in this connection one recalls Queen May of English tradition with her May Pole which is the decorated Tree of Life, for Queen May of England was also the pagan Earthmother, and her sacred day was originally Midsummer Day, or May Day.

In this connection when one studies the Gilgamish Epic one is impressed with the stags and the lions of the Garden of Ishtar on Mount Lebanon. My best guess, and I am only guessing here, is that the stag represents God's creative power (a phallic symbol in the absence of the Great Snake symbol) and the lions are a symbol for the placenta monster, Khumbaba (Achusimmutupalit).

However, we are on safer ground when we examine the particular Khumbaba guarding the gate of the stronghold in the forest (the Earthmother's vulva). There are extant clay models of the Mesopotamian Khumbaba. It is a human type placenta with an elongated umbilical cord strewn around over the placenta in such a way to delineate a horrible, carnivore-like face, quite similar to the idea of the Achusimmutupalit of the Cunas with the umbilical cord coiled upon its belly ready to strike at and capture intruders with its foetal membrane net.

ACADEMY AFFAIRS

SECTION REPORTS

SECTION I. BIOLOGY

Business Meeting

Chairman Netta Gray called the meeting of the Section to order at 11:35 A.M., April 27, 1956.

Since the report of the Annual Meeting of 1955 had been published in the Bulletin of the Academy, it was voted to dispense with the reading of the report.

The Section Chairman next called for a report of the Symposium Committee composed of the following:

Dr. Robert Platt, Chairman; Dr. Eugene P. Odum, Dr. E. S. Luttrell, Dr. H. B. Forester, Dr. Harold C. Jones, and Dr. James Stokes. Dr. Platt made the report which covered the symposium for the current annual meeting. His committee recommended that symposia be continued as a part of the annual programs and that the chairmanship of the committee be rotated. The recommendations were put in the form of a motion and unanimously accepted.

There was no report from the Membership Committee.

There was no report from the representative of the Section on the Executive Council.

The report of the Nominating Committee was given by Dr. Wilbur H. Duncan. Dr. Robert B. Platt was elected Secretary and Chairman-Elect. Dr. Netta Gray then announced the officers for 1956-57 as follows:

Chairman: Thelma Howell, Wesleyan College

Secretary and Chairman-Elect: Robert B. Platt, Emory University

There being no further business the meeting adjourned to meet at Georgia State College for Women in 1957.

Thelma Howell, *Secretary*

SECTION II. CHEMISTRY

The Section met in the Chemistry Annex at Georgia Tech on Friday and Saturday, April 27-28, 1956. The program Friday morning consisted of five contributed papers on a variety of problems. The afternoon program was a Symposium on Color and appeared to be very well received. It was attended by many members of the Academy and represented a broad cross-section of interests. The program Saturday morning was sponsored jointly by the Academy and the Georgia Section of the American Chemical Society and consisted of papers presented by undergraduate students. The entire program seemed very successful.

At the business meeting on Friday, the Section expressed its approval of a procedure for election of officers for the coming year and also next year. A nominating committee appointed by the Chair-

man, W. H. Burrows, submitted a recommendation for the office of secretary (the only one to be filled) well in advance of the meeting. A ballot carrying the name of the candidate and space for write-in nominations was circulated and returned by mail prior to the meeting. The returns were in large number and represented a wide geographical distribution. These ballots were tallied at the meeting and Gene Roberts, representative of the Jarrell-Ash Company for the Southeastern area, was elected secretary for the year 1956-57. Since the secretary automatically becomes chairman and the term of councillor continues through this year, the other officers of the Section for 1956-57 are:

Chairman: Dr. W. H. Eberhardt, Georgia Institute of Technology, Atlanta, Ga.

Councillor: Dr. J. C. Simms, North Georgia College, Dahlonega, Ga.

Respectfully submitted,

W. H. EBERHARDT, *Secretary*, 1955-56

SECTION III. EARTH SCIENCES

The following statement is a report of the sectional meeting of the Earth Science Section of the Georgia Academy of Science at Tech in late April:

The Earth Science Section of the Georgia Academy of Science met in Room 109, Civil Engineering Building, Georgia Institute of Technology, Friday morning, April 27, 1956.

A program of 14 excellent papers was presented, including geologic, geographic and archaelogic subjects. During the business meeting of the section the following officers for the coming year were elected unanimously:

Section Chairman: Dr. E. J. Parizek, University of Georgia

Secretary: Dr. Willard Grant, Emory University

Councillor: Professor Romeo Martin, Emory University

ELDON J. PARIZEK, *Secretary*

SECTION IV. PHYSICS AND MATHEMATICS

BUSINESS MEETING

The meeting was called to order by Chairman J. H. Howey. During the round table discussion, immediately preceding the business meeting, the need was felt for informing the public of the need for students in science and engineering. This discussion led to the following motion in the business meeting:

Motion: That a committee be appointed to investigate the need for obtaining a representative whose objective would be to publicize the desirability of preparing students, through basic education, for a further study of science and engineering. The committee is to make recommendations to the Council of the Academy. The motion was duly seconded and passed.

Motion: That in the election of section officers continuity of activities be assured by the secretary becoming the chairman of the

section the year following his term as secretary. The motion was seconded and passed.

The election of officers for 1956-57 resulted in the election of the following:

D. R. McMillan, Chairman
Dewey Coper, Secretary

The secretary was instructed to report the results of the election to the President of the Academy before the afternoon session, and the meeting was adjourned.

D. R. McMillan, *Secretary*

SCIENCE VII. SCIENCE EDUCATION

The annual meeting of the Education Section of the Georgia Academy of Science was held Saturday, April 28, 1956, in the Wilby Room, Price Gilbert Library at Georgia Tech. Mrs. C. J. Lammers, Chairman, called the meeting to order at 9:00 A.M.

Mr. Ashton G. Varnedoe of Savannah, Georgia, opened the meeting with a paper on "The Obligation of the College Teacher to the Secondary School Science Program." Mr. Varnedoe suggested that the colleges offer courses in adolescent phychology, better teaching methods and materials, and courses which would give the elementary and secondary teacher a good foundation in science without expecting them to fulfill the sequential program required of the specialist. He also suggested the college teacher should use his influence to increase an understanding of the real function of the secondary science teacher.

Dr. Romeo J. Martin, Department of Geology, Emory University, in his paper on "Geology and Earth Science Projects" gave several ideas for projects. These included a study of the topographical map of some section of the state, studying fossils, and making relief maps. He insisted earth science teachers contact the Department of Mines for information and help.

"The Establishment of Science Camps" was explained by Dr. Malvina Trussell, Florida State University. Such camps are an attempt to provide for the exceptional high school science student. Opportunity is given to preview every branch of science, work in laboratories, and make field trips under expert guidance. At the end of three years the demand for admittance to science camp exceeds available facilities although the camp has already enlarged to more than twice its original size.

Miss Cora Lee Cheatham, Columbus High School, gave a very interesting account of an eighth grade unit on "The Use of Georgia Minerals in the Class Room." She exhibited samples of minerals collected by the students in her classes, miniature brick they made to construct a model brick kiln, and maps they drew indicating the location of various minerals of the state. This unit has made the children more aware of the resources of Georgia.

Perhaps the highlight of the program was the paper on "The How, When, and Where of Selling Science," by Dr. W. B. Baker,

Emory University. He emphasized the fact that scientist have an obligation to laymen and the non-scientific person. A large majority of the materials advertised over radio and TV are of no value. Even though the public has utmost confidence in science and appreciates the advances science has made, it thinks of science as a gadget producer. The public should realize the scientist is not a strange, different creature because he is a dreamer of new ideas. It is these new ideas which are turned into newer gadgets by the technologist. Pure science needs public support, just as the public needs new gadgets. In order for a continued mastery of nature, science as a whole should be sold to the public, not just one small part as seen by the specialist. World ideas are constantly changing. We must recognize and be prepared for them.

The closing paper on the program was a very clever idea on "How to Teach Bird Conservation," by Mrs. Emily B. Walker, Darlington High School, Rome. Part of the trial of Otis Osio, a screech owl, was read. Otis was proven innocent of the charge made that he was a harmful bird, and he was freed to continue his good work.

At the short business session, Miss Virginia Parker, Jordan High School, Columbus, automatically became Chairman for the next year. Miss Louise Stahely, Henry Grady High School, Atlanta, was elected Secretary. After a rising vote of thanks to Mrs. C. J. Lammers, Chairman, for her success in organizing and stabilizing the Education Section, the meeting was adjourned.

VIRGINIA PARKER, *Secretary*

COMMITTEES FOR 1956-57

Jr. Academy Liaison (term expires after spring meeting of year given)

Mrs. Helen C. Richardson, '57

Mrs. Gladys Atkinson, '58

Dr. Kennedy Hodges, '57

Dr. W. H. Eberhardt, Chairman, '58

Director of Jr. Academy, Mr. Ashton Varnedoe

Academy Improvement Committee

Dr. W. B. Redmond

Miss Thelma Howell

Dr. George Seward

Dr. M. T. Clark

Dr. William H. Jones

Dr. A. S. Furcron, Chairman

Local Arrangements Committee for Annual Meeting

Dr. Clyde Keeler

Dr. J. E. Vincent

Miss Jesse Trawick

Dr. James Stokes, Chairman

(Others to be appointed later).

FELLOWS ELECTED AT THE 1956 ANNUAL MEETING

Mrs. Stephen W. (Netta) Gray, Agnes Scott College

Dr. Stephen W. Gray, Emory University

Mrs. Helene Lammers, Decatur

Dr. Eugene Mather, University of Georgia

Dr. Robert B. Platt, Emory University

Mr. Nelson Severinghaus, Lithonia

Mr. Haskell Venard, Atlanta

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